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MEMORANDUM

TO: Wellesley Park, LLC
c/o Aura Management, LLC
49 Coolidge Street
Brookline, MA 02446

FROM: Kevin M. Martin, P.E.
Geotechnical Engineer

DATE: February 14, 2018

RE: **GEOTECHNICAL SUMMARY REPORT**
PROPOSED RESIDENTIAL BUILDING
WELLESLEY PARK
148 WESTON ROAD
WELLESLEY, MASSACHUSETTS

This memorandum report serves as a geotechnical summary report for the referenced project. The contents of this memorandum are subject to the attached ***Limitations***.

SITE & PROJECT DESCRIPTION

The site includes a cleared lot about 36,000 ft² in area. A prior residential property occupied the front of the site. This building has recently been razed. There are small stockpiles of debris fill but most of the site is cleared. KMM has no knowledge of past construction, use and/or development of the site except what is visible. Based on review of the *Site Plan*, grades are shown to vary from elevation ≈158-146 ft possessing gradual contour with a low area in the central portion of the site.

The project includes a five-story, steel and wood-framed residential building about ≈15,000 ft² in footprint. Basement level parking will be provided below the building. There will also be a small wood-framed, community building to the front of the site. It is intended to support the buildings on a conventional spread footing foundation. Some deep cuts about ≈4-10 ft will be necessary to accommodate the basement parking.

SITE LOCATION

PROPOSED CONSTRUCTION

The purpose of this study is to review the subgrade conditions and provide a geotechnical evaluation related to foundation design and construction as required by the *Massachusetts State Building Code*. This report does not include an environmental assessment relative to oil, gasoline, solid waste and/or other hazardous materials. The environmental conditions of the property should be addressed by others as necessary. This study also does not include review of site design or construction issues such as infiltration systems, dry wells, retaining walls, detentions ponds, cranes pads, steepened slopes, excavation support, underground utilities, temporary shoring, blasting, ledge cuts, etc. unless specifically addressed herein.

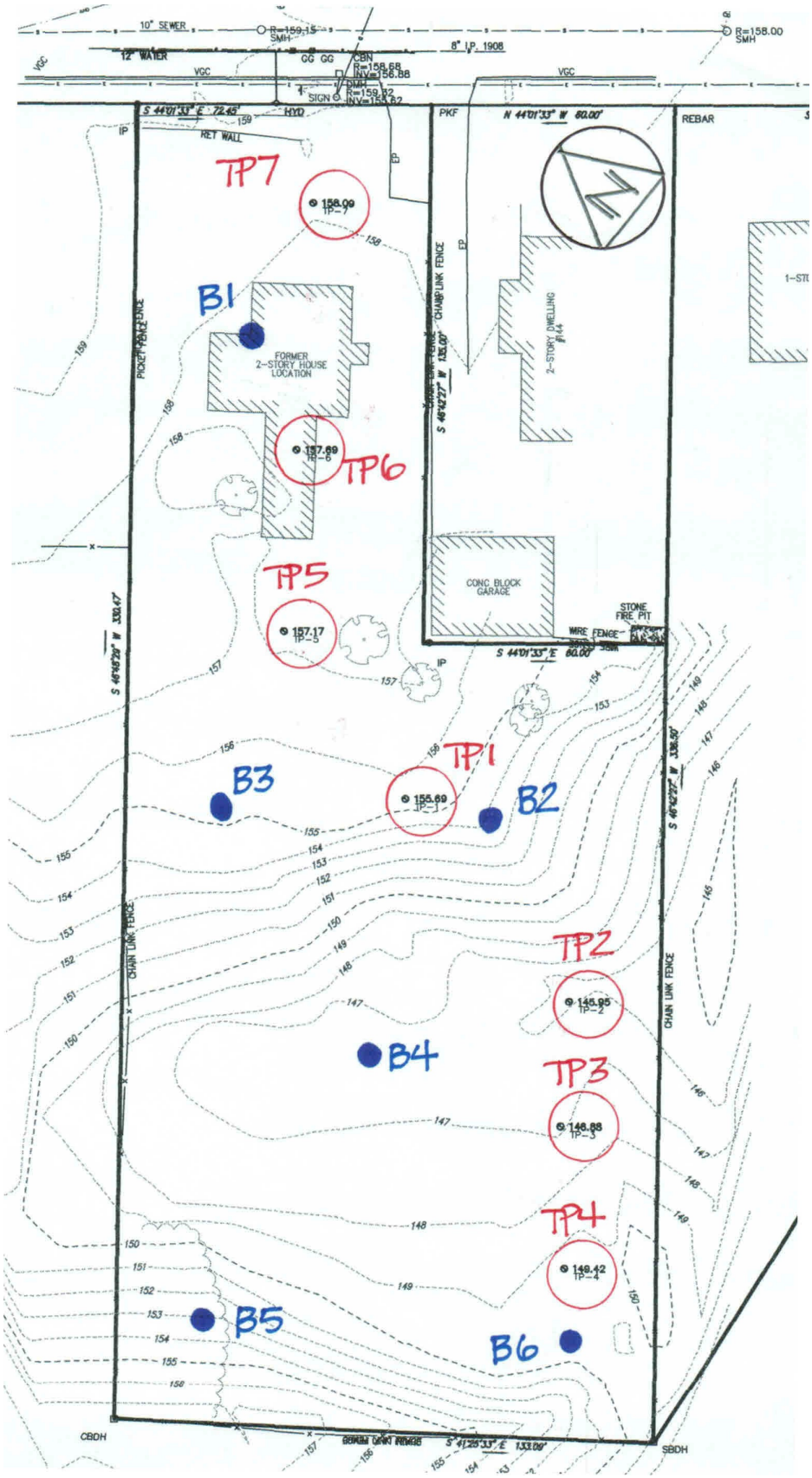
SUBSURFACE EXPLORATION PROGRAM

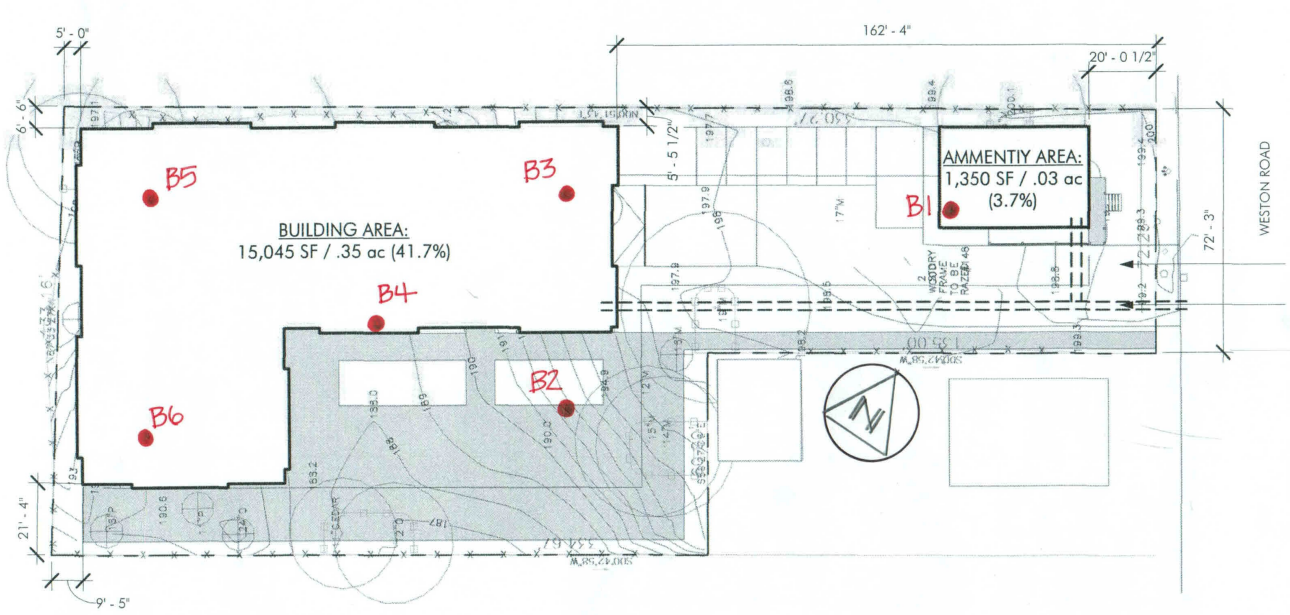
Test Borings by KMM

The exploration program for the project included six (6) test borings around the site. The test borings (B1 to B6) were advanced to refusal depths of ≈12-14 ft utilizing 4 inch hollow stem augers. Soil samples were typically retrieved at no greater than 5 ft intervals with a 2 inch diameter split-spoon sampler. Standard Penetration Tests (SPTs) were performed at the sampling intervals in general accordance with ASTM-D1586 (*Standard Method for Penetration Test and Split-Barrel Sampling of Soils*). Field descriptions and penetration resistance of the soils encountered, observed depth to groundwater, depth to refusal and other pertinent data are contained on the attached *Test Boring Logs*.

Test Pits by Others

We reviewed seven (7) test pits completed by MEG for site design purposes. The pits were excavated to depths (≈92-106 inches) with a mini-excavator.


TP7
TP6
TP5
TP1
TP2
TP3
TP4
B1
B2
B3
B4
B5
B6
FORMER 2-STORY HOUSE LOCATION
2-STORY DWELLING
CONC. BLOCK GARAGE
STONE FIRE PIT
WIRE FENCE
CHAIN LINK FENCE
PICKET FENCE
RET WALL
10" SEWER
12" WATER
8" I.P. 1908
VGC
HYD
SIGN
PKF
REBAR
EP
IP
CBDH
SBDH



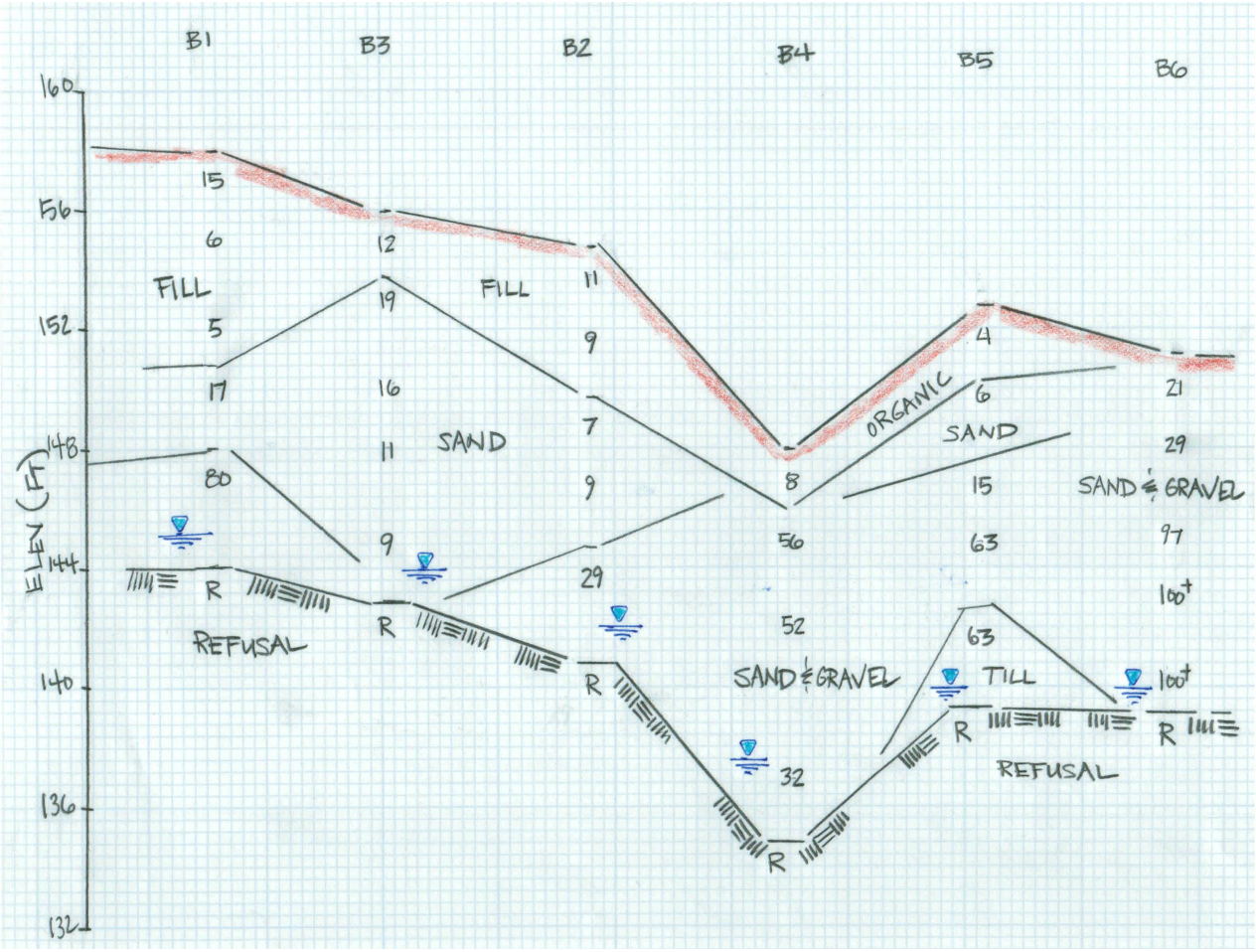
TEST BORE LOCATIONS

SUBSURFACE CONDITIONS

The subsurface conditions below (1) some shallow Fill or Organic laden soils include (2) Sand, (3) Sand & Gravel, (4) thin Glacial Till then (5) apparent Bedrock refusal. A *Subsurface Profile* depicting the soil and groundwater conditions is attached for review.

Shallow Fill and/or Organic laden soils are present throughout the site to depths of about ≈2-7 ft below grade. The Fill was deeper (≈6-7 ft) towards the front in the area of the former residence. The Fill generally includes a dark brown, loamy, fine to medium Sand with little gravel, little silt. Trace amounts of brick, rubble, wood and organic are embedded in the Fill. Other Fill should also be expected being associated with underground utilities, foundation backfill and/or general site grading. Organic laden soils also blanket a lot of the site being about ≈2 ft in collective thickness. This includes a Topsoil and loamy Subsoil Horizon. These are identified as the A-Horizon and B-Horizon respectively on the *Test Pit Logs*.

Some Clean Sand was encountered through the site being most apparent to the front. The Sand was generally loose and is well-draining. Trace to little gravel is also embedded in the Sand. A sandy Gravel or gravelly Sand were more apparent to the rear. These soils are more dense, granular and with embedded cobbles. An apparent Glacial Till was encountered at B5 about ≈10 ft below grade. The Till includes a brown, dense, well-graded, fine to medium Sand, some gravel, some silt, cobbles.



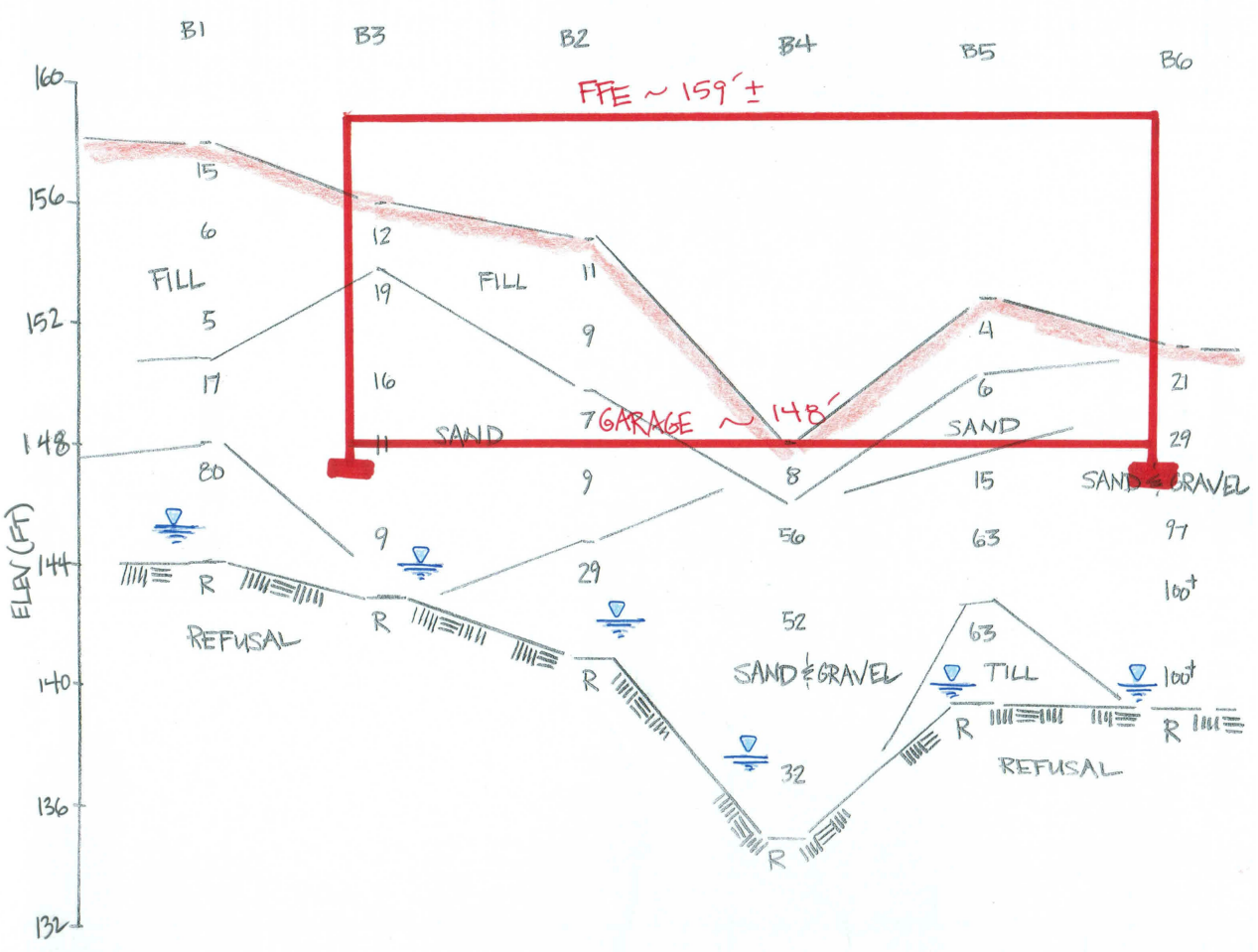
SUBSURFACE PROFILE

Test bore refusal, presumably Bedrock, was encountered throughout the site at depths of ≈12-14 ft below grade. The relative consistent depth would suggest Bedrock. The *USGS Bedrock Geologic Map of Massachusetts* depicts shallow bedrock in the area to include Dedham Granodiorite. Such rock types are characteristically hard and of sound quality. The Bedrock is expected to possess a sloping and undulating contour typical of the area geology.

Groundwater was encountered at depths of ≈11-13 ft below grade. It should be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, flooding and other factors differing from the time of the measurements. This study was completed at a time of seasonally normal groundwater.

FOUNDATION SUBGRADE RECOMMENDATIONS

The subgrade conditions are favorable for supporting the proposed buildings on a conventional spread footing foundation. The undocumented Fill and Organic laden soils are **not** considered suitable for foundation support. As such, these soils, organic laden soils, stockpiled soils, debris, abandoned foundations, intersecting utilities and other questionable matter should be fully removed from the building footprints including the *Footing Zone of Influence* (*FZOI*) to expose the parent Glacial soils. The *FZOI* is defined as that area extending laterally one foot from the edge of footing then outward and downward at a 1H:1V splay. For the most part, these soils should be penetrated to accommodate the basement level construction. Over-excavations below foundation grade shall be replaced with compacted Structural Fill (Table 1).



PROPOSED BUILDING PROFILE

The parent subgrade soils should be exposed in the foundation areas prior to casting the footings or placing structural fill. It is recommended that the parent subgrade soils be proof-rolled with vibratory densification and exhibit stable and compact conditions. The purpose of the proof-rolling is to densify the site soils and identify potential loose or unstable areas which should be removed as necessary. Proof-rolling should involve at least 4-5 passes with a vibratory compactor (minimum 950 pound static weight) operating at peak energy. During the proof rolling process, the subgrade should be observed by an Engineer to identify areas exhibiting weaving or instability. It will be necessary to remove weakened or unstable soils and replace with a Structural Fill. Proper groundwater control and storm water management are also necessary to maintain site stability.

The bearing subgrade should ultimately be stable, dewatered, protected from frost and compact throughout construction. Bearing subgrades that become weakened or disturbed due to wet conditions or other reason will be rendered unsuitable for structural support. The Contractor shall ultimately be responsible for the means and methods of temporary groundwater control, subgrade protection and site stability during construction. An Engineer from KMM should be scheduled to review the foundation subgrade conditions and preparation during construction.

FOUNDATION DESIGN RECOMMENDATIONS

The footings are expected to gain bearing support directly atop the parent soils and/or compacted structural fill. Footings may be designed using an allowable bearing capacity of 5 ksf (FS=3). The allowable bearing capacity may be increased ⅓ when considering transient loads such as seismic or wind. The bearing capacity is contingent upon the perimeter strip footings and isolated column footings being no less than 2 ft and 3 ft in width respectively. For footings less than 3 ft in lateral dimension, the net allowable bearing capacity should be reduced to one-third and multiplied by the least lateral footing dimension in feet. Foundation settlement should be less than 1 inch with differential settlement less than ½ inch. The settlement should be elastic and occur during construction. Exterior footings shall be provided with at least 4 ft of frost protection.

Recommendations for the lateral earth pressure against the unbalanced walls and drainage control are outlined on Table 2. Proper drainage behind the unbalanced foundation walls will also be necessary as summarized on Table 2.

The subsurface conditions were reviewed with respect to seismic criteria set forth in the ***Massachusetts State Building Code***. Based on the relative density of the soils and the depth to groundwater, the site is not susceptible to liquefaction in the event of an earthquake (*Section 1804.6*). Based on interpretation of the *Building Code*, the *Site Classification* is "C" (Very Dense Soil).

It is recommended that a minimum 12-inch base of *Gravel Base Fill* (Table 1) be placed below the concrete floor slab for the parking garage for moisture and frost control. The gravel base shall be no less than 12 inches for exterior concrete slabs exposed to frost (≈15 inches at ramps and entrances). A subgrade modulus of 175 pci may be used for design of the floor slab. A vapor retarder should be used below the floor slab dependent upon the floor treatment. A vapor barrier should be specified by others per ACI Standards.

Structural fill necessary within and below the foundation should also conform to the attached *Specifications* (Table 1). The site soils (Sand & Gravel) are suitable for re-use as Structural Fill provided they are segregated from the organic soils, unsuitable fill, screened of large stones and compacted to specified density. The existing Fill and Organic laden soils are **not** suitable for structural fill around the project.

FOUNDATION DRAINAGE

Due to the proposed basement level, a foundation drainage system will be required to permanently control the high groundwater as required by the *MSBC*. The purpose of the drainage system is to prevent uplift (buoyant) and lateral hydrostatic forces against the foundation walls and protect the basement level from groundwater intrusion.

A perimeter foundation drain should be located at least ≈2-3 inches above the bottom of footing elevation and six inches outward from the edge of footing. The drains should not encroach within the *Footing Zone of Influence* defined as that area extending laterally one foot from the edge of footing then outward and downward at a 1H:1V splay. Furthermore, the invert elevation of the drain should be at least 12 inches below the underside of the adjacent floor slab. The drains should consist of minimum 4 inch diameter, perforated PVC-SDR35 drain pipe encased within 12 inches of ¾-inch stone and wrapped with a filter fabric such as Mirafi 140N or equal. To provide drainage along the basement wall, a 18 inch vertical lift of *Structural Fill* (Table 1) should be placed directly behind the foundation wall to within 18 inches of finish grade. The Clean Outwash may be used for this purpose. The ground surface immediately adjacent to the foundation should be sloped away from the building to allow for positive drainage. It is also recommended that the surficial materials adjacent to the building be relatively impermeable to reduce the volume of precipitation infiltrating into the subsurface. Such impermeable materials include cement concrete, bituminous concrete or a vegetated silty topsoil.

The foundation drains will need to discharge into the storm drain system not subject to surcharge. The Site Engineer should review the discharge of the foundation drains in this regard. It is recommended that a backflow preventer be installed at the outlet of the drains to reduce the impact of surcharges and to impede rodent activity that may clog the drain. The drains should be provided with permanent clean-outs at convenient locations to facilitate access to all sections of the system. Clean-outs should be located at bends and no greater than 175 ft on-center. Roof gutters and other storm collection should not be discharged to the foundation drains. Recharge systems, infiltrators and/or dry wells shall be kept away from the basement level to prevent hydrostatic surcharge. This should also be reviewed by the Site Engineer.

The basement foundation should be waterproofed or, at a minimum, damproofed to protect against moisture damage. The basement floor should be damproofed with minimum ten-mil polyethylene or StegoWrap™ with joints lapped 10 inches below the floor slab or with application of bituminous or other approved material to the surface. Damproofing of below grade foundation walls should include the application of a bituminous or other approved material from the top of footing to above ground level. Water-proofing should be specified by others.

CONSTRUCTION CONCERNS

Subgrade Protection

The contractor should be required to maintain a stable-dewatered subgrade for the building foundation and other concerned areas during construction. Subgrade disturbance may be influenced by excavation methods, moisture, precipitation, groundwater control and construction activities. It should be understood that the site soils are considered potentially moisture sensitive and may become weakened or softened if exposed to wet conditions and construction activities. The contractor should understand these concerns and take precautions to reduce subgrade disturbance. Such precautions may include diverting storm run-off away from construction areas, reducing traffic in sensitive areas, minimizing the extent of exposed subgrade if inclement weather is forecast, backfilling footings as soon as practicable and maintaining an effective dewatering program. Soils exhibiting weaving or instability should be over-excavated to a competent bearing subgrade then replaced with a free draining structural fill or crushed stone. The moisture concerns are typically more problematic if construction takes place during the winter to spring season or other periods of inclement weather. A protective base of ¾-inch minus crushed stone may be placed ≈6 inches below and laterally beyond the footing limits for protection during construction. The stone base is to protect the site soils, facilitate any necessary dewatering and provide a dry/stable base upon which to progress foundation construction. The protective base should be considered elective and dependent upon the site conditions. The stone base should be considered necessary if wet conditions are encountered at footing grade. The protective stone base shall be tamped with a plate compactor and exhibit stable conditions.

The groundwater table, if encountered, will need to be temporarily controlled during construction to complete work in dry conditions and protect the competency of the subgrade. The groundwater table or puddled storm water should be continuously maintained at least one foot below construction grade until backfilling is complete. The groundwater is expected to be controlled with conventional sumps and pumps. The temporary sumps should be filtered with stone and fabric and extend at least 18 inches below construction grade. A ≈6 inch lift of ¾-inch minus crushed stone should be placed atop the wet subgrade to protect its competency and facilitate dewatering. The stone base should have positive slope to the sump. Adequate dewatering and storm water management are necessary for maintaining the competency of the site soils.

The bearing subgrade should ultimately be stable, dewatered, protected from frost and compact throughout construction. Bearing subgrades that become weakened or disturbed due to wet conditions or other reason will be rendered unsuitable for structural support. The Contractor shall ultimately be responsible for the means and methods of temporary groundwater control, subgrade protection and site stability during construction. An Engineer from KMM should be scheduled to review the foundation subgrade conditions and preparation during construction.

LATERAL SUPPORT OF EXCAVATION

Deep excavations (greater than ≈5-10 ft) are expected for foundation construction and possibly for utility installation around the property. Excavations should be sloped and/or laterally supported in accordance with the *Occupational and Health Administration (OSHA)* regulations (29 CFR Part 1926) and the *Commonwealth of Massachusetts Department of Labor and Industries Division of Industrial Safety (DLIDIS) - Rules and Regulations for the Prevention of Accidents in Construction Operations* (454 CMR 10.00), Part 14. Should excavations be sloped, the minimum slope based on soil type (Granular Outwash) is 1.5H:1V provided the groundwater is properly lowered below the bottom of the excavation. The foregoing slope requirement does not consider surcharge loads (stockpiled soils, equipment, materials, etc) which may be situated at the crest of the slope and vibration loads (soil compaction, sheet piling, etc). It should be noted that these slope requirements are minimums required by OSHA/DLIDIS regulations. The contractor should be ultimately responsible for design, maintenance and stability of the temporary slopes and/or shoring associated with construction activities.

Laterally supported earth systems should be designed by a qualified Professional Engineer retained by the contractor per OSHA Regulations. The deep excavations along the property limits may require excavation support given the abutting property limits. Cantilevered sheeting or soldier piles with lagging are expected to be feasible for depths of ≈8-10 ft.

CONSTRUCTION MONITORING

It is recommended that a qualified engineer or representative be retained to review earthwork activities such as the preparation of the foundation bearing subgrade and the placement/compaction of Structural Fill. It is recommended that KMM be retained to provide construction monitoring services. This is to observe compliance with the design concepts presented herein.

We trust the contents of this memorandum report are responsive to your needs at this time. Should you have any questions or require additional assistance, please do not hesitate to contact our office.

kmm51/WellesleyPark.wpd

LIMITATIONS

Explorations

1. The analyses, recommendations and designs submitted in this report are based in part upon the data obtained from preliminary subsurface explorations. The nature and extent of variations between these explorations may not become evident until construction. If variations then appear evident, it will be necessary to re-evaluate the recommendations of this report.

2. The generalized soil profile described in the text is intended to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized and have been developed by interpretation of widely spaced explorations and samples; actual soil transitions are probably more gradual. For specific information, refer to the individual test pit and/or boring logs.

3. Water level readings have been made in the test pits and/or test borings under conditions stated on the logs. These data have been reviewed and interpretations have been made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, and other factors differing from the time the measurements were made.

Review

4. It is recommended that this firm be given the opportunity to review final design drawings and specifications to evaluate the appropriate implementation of the recommendations provided herein.

5. In the event that any changes in the nature, design, or location of the proposed areas are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of the report modified or verified in writing by KMM Geotechnical Consultants, LLC.

Construction

6. It is recommended that this firm be retained to provide geotechnical engineering services during the earthwork phases of the work. This is to observe compliance with the design concepts, specifications, and recommendations and to allow design changes in the event that subsurface conditions differ from those anticipated prior to the start of construction.

Use of Report

7. This report has been prepared for the exclusive use of Delanson Realty Partners, LLC in accordance with generally accepted soil and foundation engineering practices. No other warranty, expressed or implied, is made.

8. This report has been prepared for this project by KMM Geotechnical Consultants, LLC. This report was completed for preliminary design purposes and may be limited in its scope to complete an accurate bid. Contractors wishing a copy of the report may secure it with the understanding that its scope is limited to preliminary geotechnical design considerations only.

TABLE 1

Wellesley Park
Wellesley, Massachusetts

Recommended Soil Gradation & Compaction Specifications

Gravel Base Fill
(Select Crushed Gravel Fill)

SIEVE SIZE	PERCENT PASSING BY WEIGHT
3 inch	100
3/4 inch	60-90
No. 4	20-70
No. 200	2-8

NOTE: For minimum 8-inch base below Concrete Floor Slab-on-Grade
For minimum 12-inch base for exterior concrete slabs exposed to frost
For minimum 12-inch base for Garage level slab
For minium 15-inch base at exterior ramps, entrances, egress, aprons, etc.
Shall have less than 12% fines (No. 200 sieve) based on the Sand fraction

Structural Fill
(Gravelly SAND, little Silt)

SIEVE SIZE	PERCENT PASSING BY WEIGHT
5 inch	100
3/4 inch	60-100
No. 4	20-80
No. 200	0-10

NOTE: For use as structural load support below the foundations
For use as backfill behind unbalanced foundation/retaining walls
A ¾-inch crushed stone may be used in wet conditions

Structural Fill placed beneath the foundation should include the *Footing Zone of Influence* which is defined as that area extending laterally one foot from the edge of the footing then outward and downward at a 1H:1V splay. Structural Fill should be placed in loose lifts not exceeding 12 inches for heavy vibratory rollers and 8 inches for vibratory plate compactors. Structural Fill on the project should be compacted to at least 95 percent of maximum dry density as determined by the Modified Proctor Test (ASTM-D1557). The fill shall be compacted within ±2 of the optimum moisture content. The adequacy of the compaction efforts should be verified by field density testing which is also a requirement of the *Massachusetts State Building Code*.

TABLE 2

Wellesley Park
Wellesley, Massachusetts

Recommended Lateral Earth Pressures & Drainage for Unbalanced Walls

Lateral earth pressures for the structural design and stability analysis of unbalanced foundation walls (basement walls, retaining walls, elevator pit, etc) are provided herein. The following table outlines the recommended lateral earth pressure coefficients and equivalent fluid weights:

WALL CONDITION	LATERAL TRANSLATION (Δ/H)	EARTH PRESSURE COEFFICIENT (K)	EQUIVALENT FLUID WEIGHT (γ_{EFW})
restrained	0	K_o	60 pcf
no restraint	0.002	K_a	35 pcf
no restraint	0.02	K_p (FS=3)	125 pcf
seismic	n/a	K_{eq}	see note

where: Δ = movement at top of wall by tilting or lateral translation
H = height of wall

The above lateral earth pressures are based upon:

1. Rankine earth pressure theory;
2. Retaining wall backfilled with Structural Fill (Table 1)
3. Unit weight of backfill less than 125 pcf
4. No hydrostatic pressures
5. No surcharge loading;
6. A level backfill in front and behind of wall;
7. Seismic loads distributed as an inverse triangle over the height of wall (*MSBC*);
8. Dynamic/compaction stresses accounted for with seismic pressures;
9. Soil backfill densified with plate compactors within 3 ft lateral distance of wall;
10. Top 2 ft should not be considered for passive resistance.

The lateral load due to seismic pressure shall be in accordance with *Section 9.5.2.9* of the *MSBC*. *Equation 9.5.2.9* shall be used to estimate the seismic force (F_w). The unit weight of the backfill used in this equation is 125 pcf (Structural Fill). There are no soils subject to liquefaction below and/or behind the wall.

The lateral resistance of retaining walls should also accommodate surcharge loads. Uniformly distributed loads should be superimposed along the face of the wall at a magnitude equal to the surcharge pressure multiplied by the appropriate earth pressure coefficient. Surcharge loads should be considered where they are located within a horizontal distance equivalent to 1.0 times the height of the wall. Anticipated point or line loads situated behind the wall should be evaluated in accordance with linear elastic theory.

For frost and drainage concerns, it is recommended that *Structural Fill* (Table 1) be placed directly behind the unbalanced walls. The ground surface immediately adjacent to the unbalanced foundation should be sloped away from the building to allow for positive drainage. It is also recommended that the surficial materials adjacent to the building be relatively impermeable to reduce the volume of precipitation infiltrating into the subgrade. Such impermeable materials include Portland cement concrete, bituminous concrete, or a vegetated silty topsoil. The purpose of the low permeable soils or barriers is to mitigate storm water flow towards the embedded foundation.

Unbalanced foundation walls (basement garage level) should be provided with adequate footing drains per the *MSBC*. The drains should be located along the periphery of the footprint. The perimeter foundation drain should be located at least ≈2-3 inches above the bottom of footing elevation and six inches outward from the edge of footing. The drains should not encroach within the *Footing Zone of Influence* defined as that area extending laterally one foot from the edge of footing then outward and downward at a 1H:1V splay. Furthermore, the invert elevation of the drain should be at least 12 inches below the underside of the adjacent floor slab. The drains should consist of minimum 4 inch diameter, perforated PVC-SDR 35 drain pipe encased within 12 inches of ¾-inch stone and wrapped with a filter fabric such as Mirafi 140N or equal. The drains may discharge via gravity to a storm drain line no subject to surcharge. The Site Engineer should review the discharge of the drains. The drains should be provided with permanent clean-outs at convenient locations to facilitate access to all sections of the system. Clean-outs should be located at bends and no greater than 175 ft on-center. Roof gutters and other storm collection should not be discharged to the foundation drains. Recharge systems, infiltrators and/or dry wells shall be kept away from the basement level to prevent hydrostatic surcharge.

If the unbalanced foundation walls can not be drained to alleviate hydrostatic forces, then the lateral earth pressure equivalent fluid weight should be increased to 90 pcf. Such earth pressures should be used for the elevator pits as necessary.

The recommended friction factors to be used for retaining wall design are as follows:

<u>Recommended Friction Factor (f)</u>
f= tan(δ), where δ is the interface friction angle

- Concrete against the following soils

Structural Fill (Table 1)	0.50
Glacial Soils	0.50

TEST BORING LOG

SHEET 1

Soil Exploration Corp.
Geotechnical Drilling
Groundwater Monitor Well
148 Pioneer Drive
Leominster, MA 01453
978 840-0391

Proposed Building
Site: 148 Weston Road
Wellesley, MA.

BORING B-1

PROJECT NO. 18-0142

DATE: February 1, 2018

Ground Elevation:
Date Started: January 31, 2018
Date Finished: January 31, 2018
Driller: PG
Soil Engineer/Geologist:

GROUNDWATER OBSERVATIONS

DATE	DEPTH	CASING	STABILIZATION
1/31/18	13 ft	n.a	

Depth Ft.	Casing bl/ft	Sample No.	Pen/Rec	Sample Depth	Blows/6"	Strata	Visual Identification of Soil and / or Rock Sample
1		1	15"	0'0" - 2'0"	6-6-9-8		Dark Brown, fine to medium Sand, some gravel, little silt (FILL)
		2	12"	2'0" - 4'0"	4-3-3-4		Dark Brown, loamy, f-m Sand, little gravel, little silt, dry (FILL)
5		3	9"	5'0" - 7'0"	5-3-2-3		
		4	18"	7'0" – 9'0"	7-8-9-12	7'	Brown, fine to coarse Sand, trace silt, dry (SAND)
10		5	15"	10'0"- 12'0"	14-36-44-31	10'	Brown, fine to medium Sand & Gravel, little silt, dry (SAND & GRAVEL)
15						14'	Auger Refusal at 14 ft Water encountered at 13 ft upon completion
20							
25							
30							
35							

Notes: Hollow Stem Auger Size - 4 1/4"

Cohesionless: 0 - 4 V. Loose, 4 - 10 Loose, 10 -30 M Dense, 30 -50 Dense, 50+ V
Cohesive: 0 -2 V Soft, 2 -4 Soft, 4 -8 M 8 -15 Stiff, 15 -30 V. Stiff, 30 + Hard.

Trace	0 to 10%
Little	10 to 20%
Some	20 to 35%
And	35% to 50%

	CASING	SAMPLE	CORE TYPE
ID SIZE (IN)		SS	
HAMMER WGT (LB)		140 lb.	
HAMMER FALL (IN)		30"	

TEST BORING LOG

SHEET 2

Soil Exploration Corp.
Geotechnical Drilling
Groundwater Monitor Well
148 Pioneer Drive
Leominster, MA 01453
978 840-0391

Proposed Building
Site: 148 Weston Road
Wellesley, MA.

BORING B-2

PROJECT NO. 18-0142

DATE: February 1, 2018

Ground Elevation:
Date Started: January 31, 2018
Date Finished: January 31, 2018
Driller: PG
Soil Engineer/Geologist:

GROUNDWATER OBSERVATIONS

DATE	DEPTH	CASING	STABILIZATION
1/31/18	13 ft	n/a	

Depth Ft.	Casing bl/ft	Sample No.	Pen/Rec	Sample Depth	Blows/6"	Strata	Visual Identification of Soil and / or Rock Sample
1		1	18"	0'0" - 2'0"	7-5-6-5		Black, loamy-organic, silty Sand, trace gravel, wood, dry (FILL)
		2	12"	2'0" - 4'0"	5-3-6-4		Black-Brown, Sand w/ gravel, rubble, loam, roots (FILL)
5		3	15"	5'0" - 7'0"	3-4-3-5	5'6"	
		4	21"	7'0" – 9'0"	4-5-4-6		Brown, fine to medium Sand, trace silt, dry (SAND)
10		5	18"	10'0"- 12'0"	11-13-16-20	10'	Brown, fine to medium Sand & Gravel, trace silt, dry (SAND & GRAVEL)
15						14'	Auger Refusal at 14 ft Water encountered at 13 ft upon completion
20							
25							
30							
35							

Notes: Hollow Stem Auger Size - 4 1/4"

Cohesionless: 0 - 4 V. Loose, 4 - 10 Loose, 10 -30 M Dense, 30 -50 Dense, 50+ V
Cohesive: 0 -2 V Soft, 2 -4 Soft, 4 -8 M 8 -15 Stiff, 15 -30 V. Stiff, 30 + Hard.

Trace	0 to 10%
Little	10 to 20%
Some	20 to 35%
And	35% to 50%

	CASING	SAMPLE	CORE TYPE
ID SIZE (IN)		SS	
HAMMER WGT (LB)		140 lb.	
HAMMER FALL (IN)		30"	

TEST BORING LOG

SHEET 3

Soil Exploration Corp.
Geotechnical Drilling
Groundwater Monitor Well
148 Pioneer Drive
Leominster, MA 01453
978 840-0391

Proposed Building
Site: 148 Weston Road
Wellesley, MA.

BORING B-3

PROJECT NO. 18-0142

DATE: February 1, 2018

Ground Elevation:
Date Started: January 31, 2018
Date Finished: January 31, 2018
Driller: PG
Soil Engineer/Geologist:

GROUNDWATER OBSERVATIONS

DATE	DEPTH	CASING	STABILIZATION
1/31/18	12 ft	n/a	

Depth Ft.	Casing bl/ft	Sample No.	Pen/Rec	Sample Depth	Blows/6"	Strata	Visual Identification of Soil and / or Rock Sample
1		1	12"	0'0" - 2'0"	4-6-6-8	2'	Dark Brown, loamy, silty Sand, little gravel, trace wood (FILL)
		2	18"	2'0" - 4'0"	8-9-10-12		Brown, fine to coarse Sand, trace silt, dry
5		3	18"	5'0" - 7'0"	7-8-8-9		Brown, f-c Sand, little gravel, trace silt, dry
		4	21"	7'0" – 9'0"	6-5-6-8		Brown, Fine Sand, trace silt, dry (SAND)
10		5	18"	10'0"- 12'0"	4-5-4-7		Brown, fine to medium Sand, little gravel, little silt, dry
						13'	Auger Refusal at 13 ft
15							Water encountered at 12 ft upon completion
20							
25							
30							
35							

Notes: Hollow Stem Auger Size - 4 1/4"

Cohesionless: 0 - 4 V. Loose, 4 - 10 Loose, 10 -30 M Dense, 30 -50 Dense, 50+ V
Cohesive: 0 -2 V Soft, 2 -4 Soft, 4 -8 M 8 -15 Stiff, 15 -30 V. Stiff, 30 + Hard.

Trace	0 to 10%
Little	10 to 20%
Some	20 to 35%
And	35% to 50%

	CASING	SAMPLE	CORE TYPE
ID SIZE (IN)		SS	
HAMMER WGT (LB)		140 lb.	
HAMMER FALL (IN)		30"	

TEST BORING LOG

SHEET 4

Soil Exploration Corp.
Geotechnical Drilling
Groundwater Monitor Well
148 Pioneer Drive
Leominster, MA 01453
978 840-0391

Proposed Building
Site: 148 Weston Road
Wellesley, MA.

BORING B-4

PROJECT NO. 18-0142

DATE: February 1, 2018

Ground Elevation:
Date Started: January 31, 2018
Date Finished: January 31, 2018
Driller: PG
Soil Engineer/Geologist:

GROUNDWATER OBSERVATIONS

DATE	DEPTH	CASING	STABILIZATION
1/31/18	12 ft	n/a	

Depth Ft.	Casing bl/ft	Sample No.	Pen/Rec	Sample Depth	Blows/6"	Strata	Visual Identification of Soil and / or Rock Sample
1		1	9"	0'0" - 2'0"	3-4-4-5	2'	Black, Organic, Silt & Sand, wet (ORGANIC)
		2	6"	2'0" - 4'0"	16-25-31-25		Brown, f-m Sand & Gravel, trace silt, dry
5		3	12"	5'0" - 6'7"	18-19-33-100/1"		Brown, fine to medium Sand & Gravel, trace silt, cobbles, dry (SAND & GRAVEL)
10		4	15"	10'0"- 12'0"	16-18-14-23		Brown, f-c Sand & Gravel, little silt, wet
						13'	Auger Refusal at 13 ft
15							Water encountered at 12 ft upon completion
20							
25							
30							
35							

Notes: Hollow Stem Auger Size - 4 1/4"

Cohesionless: 0 - 4 V. Loose, 4 - 10 Loose, 10 -30 M Dense, 30 -50 Dense, 50+ V
Cohesive: 0 -2 V Soft, 2 -4 Soft, 4 -8 M 8 -15 Stiff, 15 -30 V. Stiff, 30 + Hard.

Trace	0 to 10%
Little	10 to 20%
Some	20 to 35%
And	35% to 50%

	CASING	SAMPLE	CORE TYPE
ID SIZE (IN)		SS	
HAMMER WGT (LB)		140 lb.	
HAMMER FALL (IN)		30"	

TEST BORING LOG

SHEET 5

Soil Exploration Corp.
Geotechnical Drilling
Groundwater Monitor Well
148 Pioneer Drive
Leominster, MA 01453
978 840-0391

Proposed Building
Site: 148 Weston Road
Wellesley, MA.

BORING B-5

PROJECT NO. 18-0142

DATE: February 1, 2018

Ground Elevation:
Date Started: January 31, 2018
Date Finished: January 31, 2018
Driller: PG
Soil Engineer/Geologist:

GROUNDWATER OBSERVATIONS

DATE	DEPTH	CASING	STABILIZATION
1/31/18	13 ft	n/a	

Depth Ft.	Casing bl/ft	Sample No.	Pen/Rec	Sample Depth	Blows/6"	Strata	Visual Identification of Soil and / or Rock Sample
1		1	9"	0'0" - 2'0"	5-1-3-2	2'	Brown, fine to medium Sand, trace gravel, little silt, organic
		2	15"	2'0" - 4'0"	2-3-3-4		Brown, fine to coarse Sand, trace gravel, trace silt, dry (SAND)
5		3	18"	5'0" - 7'0"	7-8-7-11	7'	Brown, fine to coarse Sand, little gravel, trace silt, dry
		4	12"	7'0" – 9'0"	16-27-36-45		Brown, fine to medium Sand & Gravel, little silt
10		5	18"	10'0"- 12'0"	20-26-37-53	10'	Brown, f-m Sand, some gravel, some silt, cobbles (TILL)
15						13'5"	Auger Refusal at 13½ ft Water encountered at 13 ft upon completion
20							
25							
30							
35							

Notes: Hollow Stem Auger Size - 4 1/4"

Cohesionless: 0 - 4 V. Loose, 4 - 10 Loose, 10 -30 M Dense, 30 -50 Dense, 50+ V
Cohesive: 0 -2 V Soft, 2 -4 Soft, 4 -8 M 8 -15 Stiff, 15 -30 V. Stiff, 30 + Hard.

Trace	0 to 10%
Little	10 to 20%
Some	20 to 35%
And	35% to 50%

	CASING	SAMPLE	CORE TYPE
ID SIZE (IN)		SS	
HAMMER WGT (LB)		140 lb.	
HAMMER FALL (IN)		30"	

TEST BORING LOG

SHEET 6

Soil Exploration Corp.
Geotechnical Drilling
Groundwater Monitor Well
148 Pioneer Drive
Leominster, MA 01453
978 840-0391

Proposed Building
Site: 148 Weston Road
Wellesley, MA.

BORING B-6

PROJECT NO. 18-0142

DATE: February 1, 2018

Ground Elevation:
Date Started: January 31, 2018
Date Finished: January 31, 2018
Driller: PG
Soil Engineer/Geologist:

GROUNDWATER OBSERVATIONS

DATE	DEPTH	CASING	STABILIZATION
1/31/18	11 ft	n/a	

Depth Ft.	Casing bl/ft	Sample No.	Pen/Rec	Sample Depth	Blows/6"	Strata	Visual Identification of Soil and / or Rock Sample
1		1	15"	0'0" - 2'0"	9-11-10-9		Brown, fine to coarse Sand & Gravel, trace silt (SAND & GRAVEL)
		2	18"	2'0" - 4'0"	12-16-13-10		
5		3	18"	5'0" - 7'0"	27-49-48-47		Brown, fine to medium Sand, some gravel, little silt, cobbles, dry
		4	6"	7'0" – 8'9"	57-61-100/2"		
10		5	6"	10'0"- 11'3"	37-51-100/3"	12'	Brown, f-m Sand & Gravel, little silt, cobbles, boulders, dry
15							Auger Refusal at 12 ft Water encountered at 11 ft upon completion
20							
25							
30							
35							

Notes: Hollow Stem Auger Size - 4 1/4"

Cohesionless: 0 - 4 V. Loose, 4 - 10 Loose, 10 -30 M Dense, 30 -50 Dense, 50+ V
Cohesive: 0 -2 V Soft, 2 -4 Soft, 4 -8 M 8 -15 Stiff, 15 -30 V. Stiff, 30 + Hard.

Trace	0 to 10%
Little	10 to 20%
Some	20 to 35%
And	35% to 50%

	CASING	SAMPLE	CORE TYPE
ID SIZE (IN)		SS	
HAMMER WGT (LB)		140 lb.	
HAMMER FALL (IN)		30"	